# METHOD FOR GENERATING AND
## ASSIGNING IDENTIFYING TAGS TO SOUND FILES

## BACKGROUND OF THE INVENTION
### 1. FIELD OF THE INVENTION

The present invention is relates broadly to methods and techniques for identifying sound files. More particularly, the present invention concerns a method for generating and assigning an identifying tag to a sound file, wherein the tag is generated using a standard number of chosen points on the sound file's unique frequency domain, thereby facilitating determining the sound file's location, transferring the sound file, and comparing multiple sound files.

### 2. DESCRIPTION OF THE PRIOR ART

It will be appreciated that it is often desirable or necessary to assign identifying tags to sound files to facilitate accurate identification of such files. Currently, this is accomplished either by a user who assigns a tag arbitrarily chosen based upon, for example, a name, date, or description of the sound file, or by a computer that assigns a tag based upon an arbitrarily selected segment of the sound file. Unfortunately, these methods result in subjective and arbitrary identifying tags that do not accurately represent or label the file and that lack of standardization and functionality. Such arbitrary and inaccurate identifying tags can, and do, create situations where two versions of essentially the same sound file are assigned different tags due to the subjective nature of the tagging system. For example, if a computer uses the first 100 bits of a sound file to create an identifying tag for that file, the computer may generate a substantially different identifying tag for a second, virtually identical sound file. This occurs because no consideration is given to oddities in the sound files such as white noise, static, gaps, and poor quality. Such oddities can create slight differences in the chosen 100 bit segment of the sound files and, though the files are otherwise virtually identical, cause the computer to assign different identifying tags.

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Additionally, because identifying tags assigned to sound files are not standardized, links are to the sound files are also not standardized. This results in inefficient searching that can return large number of false positives and false negatives that must then be manually searched in order to identify the desired sound file.

Due to the above-identified and other problems and disadvantages in the art, a need exists for an improved method of generating and assigning identifying tags to sound files.

SUMMARY OF THE INVENTION

The present invention provides a distinct advance in the relevant art(s) to overcome the above-described and other problems and disadvantages in the prior art by providing a method for generating and assigning identifying tags to sound files. The present method is distinguished from the prior art method of generating and assigning identifying tags to sound files in that, whereas the current method assigns identifying tags based on arbitrary and subjective criteria, the present method uses standardized criteria to assign the identifying tags. The use of standardized criteria creates a universal system for generating and assigning identifying tags for any sound file.

Practicing the method involves selecting points on the frequency domain of the sound file to generate the identifying tag. This use of the unique frequency domain of each sound file results in a unique identifier for each file while minimizing oddities such as gaps, static, and poor quality in the sound files. Thus, it will be appreciated that the present invention provides substantial advantages over the prior art.

These and other important features of the present invention are more fully described in the section titled DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT, below.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

A preferred embodiment of the present invention is described in detail below with reference to the attached drawing figures, wherein:

FIG. 1 is a flowchart of preferred steps involved in the method of the present invention; and

FIG. 2 is a depiction of an identifying sound tag generated by the method of FIG. 1.

## DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

With reference to the figures, a method of generating and assigning an identifying tag for a sound file is herein disclosed in accordance with a preferred embodiment of the present invention. Broadly, the method uses standardized criteria to create the identifying tag for the sound files based upon the sound file's unique frequency domain.

It will be appreciated that, as a general matter, a sound is composed of an infinite summation of smaller component frequencies. Furthermore, the sound can be converted from the standard time domain to its frequency domain. In the frequency domain the sound can be seen as the amplitude of all the different component frequencies. Thus, whereas in the time domain the sound is be measured in power versus time, in the frequency domain the sound is measured in amplitude versus frequency.

The present method of generating and assigning the identifying tag to the sound file is distinguished from well-known prior art methods in that use of the frequency domain eliminates a great deal of subjectivity and arbitrariness. Because each sound file has a unique frequency domain it is used as a sort of fingerprint for the file, applicable only to that sound file. At the same time, however, where sound files are ideally identical but actually contain small oddities that would result, using the prior art methods, in a separate identification, translation to the frequency domain substantially minimizes those oddities so that sound files that are ideally identical will appear more so.

Referring to FIG. 1, the method of the present invention proceeds as follows. The sound file is first converted to a series of points corresponding to power (measured in decibels) versus time (measured in seconds), as depicted in box 10. The

points are then translated from the time domain into the frequency domain using a Fast Fourier Transformation, as depicted in box 12. This translation yields a set of points that represent power versus frequency rather than power versus time. This translation has the beneficial effect of minimizing any oddities in the sound file, such as, for example, white noise, static, poor quality, or gaps, that might otherwise make ideally identical sound files appear substantially different, particularly to an automated searching or cataloging mechanism. Thus, the method of the present invention acts to substantially minimize or eliminate problems encountered when using prior art methods, such as, for example, false positives and false negatives when searching for a particular sound file, or differently-labeled versions of the same sound file. Next, a number of these points from specific frequencies are selected, as depicted in box 14. Increasing the number of points selected increases the effectiveness of the method for generating the identifying tag. Preferably, the same specific frequencies are used for all sound files in order to maintain a desired level of standardization in implementing the method. The resulting set of points is the identifying tag, as depicted in box 16.

For example, as shown in FIG. 2, if a sound file is converted into the frequency domain and three points are chosen, [2 db, 1Hz] [200 db, 10 Hz] [20db, 100Hz], the resulting identifying tag 18 would be 2,1,200,10,20,100. Another, different song file might have an identifying tag of 5,1,110,10,17,100. Note that the specific frequencies of 1Hz, 10Hz, and 100Hz remain constant while the power at each of these frequencies is different for the two songs. As mentioned, increasing the number of points increases the effectiveness of the method to eliminate effects due to oddities. Thus, for example, where two song files have a significant number of identical power versus frequency points, and an insignificant number of differences, then it might be said that these song files are identical but for a small or insignificant number of oddities at the sampling points.

Each sound file's unique tag allows the sound to be though of as a point in N dimensional space where N is the number of points used to create the tag. Thus, it will be appreciated that the generated identifying tags are particularly effective because each sound file is assigned its own unique "position" in N dimensional space

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based on it's own points. In order to further eliminate oddities or identify similarities or differences in songs, the relative positions of two or more sound files can be compared (using, e.g., the well-known distance formula for determining distance between two points in space). Sound files that are similar or identical would appear closer together, and sound files that are dissimilar would appear more distant.

From the preceding description, it will be appreciated that the method of the present invention provides a number of substantial advantages over prior art methods of generating and assigning identifying tags to sound files, including, for example, that it provides a substantially standardized method of generating the identifying tags that minimizes oddities and facilitates subsequent comparisons of the sound files.

Although the invention has been described with reference to the preferred embodiments, it is noted that equivalents may be employed and substitutions made herein without departing from the scope of the invention as recited in the claims. For example, the method can be extended to substantially any application involving substantially any type of sound files, such as, for example, music files, sonar files, and personal identification files based on bodily sounds (e.g., speech or heart sounds).

Having thus described the preferred embodiment of the invention, what is claimed as new and desired to be protected by Letters Patent includes the following: